

**Technical Note
e-Notification**

No. 06

January 29, 2020

Updated: 4/9 &
6/15/2020

Technical Note 06

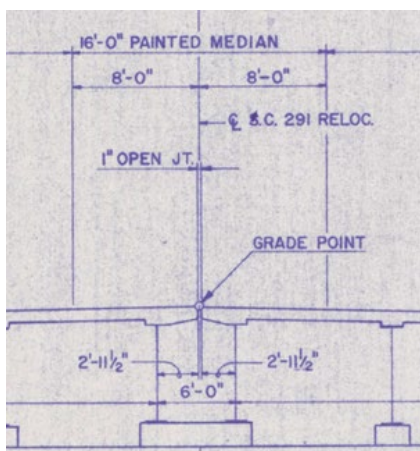
With Updated Items 1, 3, 5, & 6

1. Parallel Structures in Close Proximity (*HD049)

Where twin, sister, or parallel structures exist in close proximity, unique Asset IDs should be assigned to each structure if it is clear the structures are acting independently of one another (i.e. a longitudinal joint or larger physical separation) and opposing traffic is physically separated by a barrier or median, as to prevent traffic from crossing from one structure to the other. If these two independent structures currently share an Asset ID, a new Asset ID should be requested using the Asset ID Request Form found in Appendix A5.1 of the Load Rating Guidance Document (LRGD).

If the separated superstructures share a substructure (i.e. the end bents are continuous and support both superstructures), substructure and/or foundational elements should be labeled as if they were one structure, continuing sequentially from the labeling diagram of the first Asset ID to the next. On the labeling diagrams of both Asset IDs, add a note stating, "For continuation of substructure, see Asset [#####]."

For cases where structures are acting independently of one another by means of a longitudinal joint (or similar) but do not have a physical separation preventing traffic from crossing the joint, the parallel structures should remain one Asset ID. If the structures are currently distinguished by two Asset IDs, one ID should be retired through the formal process. Two separate AASHTOWare Bridge Rating (BrR) models shall be generated for each superstructure carrying each direction. An example of this situation is presented below:



**Example: As-Built Typical Section
Showing 1" Open Longitudinal Deck**



**Example: Looking Down at a 1" Open
Longitudinal Deck Joint**

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Alternatively, if one structure is not physically separated but appears to be (i.e. carrying two-way traffic), it should still retain one Asset ID. If it has two Asset IDs, then one ID should be retired through the formal process.

In lieu of an obvious structure separation or absence of details, coordinate with Road Data Services to determine the proper classification.



Example: Approach View of a Bridge Superstructure Separated by an Open Longitudinal Deck Joint with No Physical Separation (i.e. Barrier, Raised Median, Etc.)

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2. Rating and Posting of Emergency Vehicles (*HD033)

EV2 and EV3 are legal loads. All bridges shall be rated for EV2 and EV3. Perform posting avoidance measures and, if necessary, complete the Bridge Signing/Posting Form for the EVs similar to all other AASHTO and State Legal Loads. The “Posting Summary” sheet of the Load Rating Summary Form (LRSF) provides guidance to the load rating engineer for populating the EV posting sign.

3. Bridge Signing/Posting Form

In accordance with LRGD Section 19.3, “if the load rater determines that posting avoidance measures would not have a significant impact on the posting need, the load rater shall submit the Bridge Signing/Posting Form. The Bridge Maintenance Office (BMO) will review the form, and the State Bridge Maintenance Engineer (SBME), or designee, should approve the Posting Form within ten (10) business days upon receipt.” The process is further described in the Bridge Posting Flowchart on the next page.

In order to accommodate review of the Posting Form, the load rater shall submit additional documentation with the Bridge Signing/Posting Form as outlined below:

- Excel Version of Load Rating Summary Form (LRSF)
- As-Built or As-Let Plans
- AASHTOWare BrR xml file (or input file from other approved rating software)
- Latest Bridge Inspection Report
- Site Assessment form
- National Bridge Inventory (NBI) datasheet (Or document the ADT, %Truck Traffic and detour length in Section 3 of the Bridge Signing/Posting Form)

Email the required documentation to SCDOT_LR_BMO_Approval@mbakerintl.com. For file transfers too large for email, use Michael Baker International’s eFTP site (<https://eftp.mbakerintl.com/>) or ProjectWise. New eFTP users must register with the site. Please include the link generated by the site in the email request.

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Tips for completing the Posting Form:

- In Section 3, list any posting avoidance measure(s) which were considered prior to recommending bridge posting; also list any special considerations required in developing the posting limits proposed.

SECTION 3: COMMENTS

ADT=3200; % Truck Traffic=5%; Concrete tee beam bridge, built in 1922, H-15 design load, has 8" thick wearing surface. It was determined that posting avoidance measures in LRGD 19.2 will not have a significant impact on the posting need.

- For "Sign Required?" select yes only for signs requiring posting. For signs that do not require posting, leave all fields blank.

R12-9-36

EMERGENCY VEHICLE WEIGHT LIMITS		
SINGLE AXLE	16	T
TANDEM	27	T
GROSS	38	T

Sign
Required?

☒ Yes

☐ No

- The "Load Rating Engineer" and "Quality Control Engineer" boxes must be filled out.
- The filename for Signing/Posting Forms should follow the format of #####_Bridge_Signing-Posting_Form_Signed.pdf; where ##### is the 5-digit federal bridge number.

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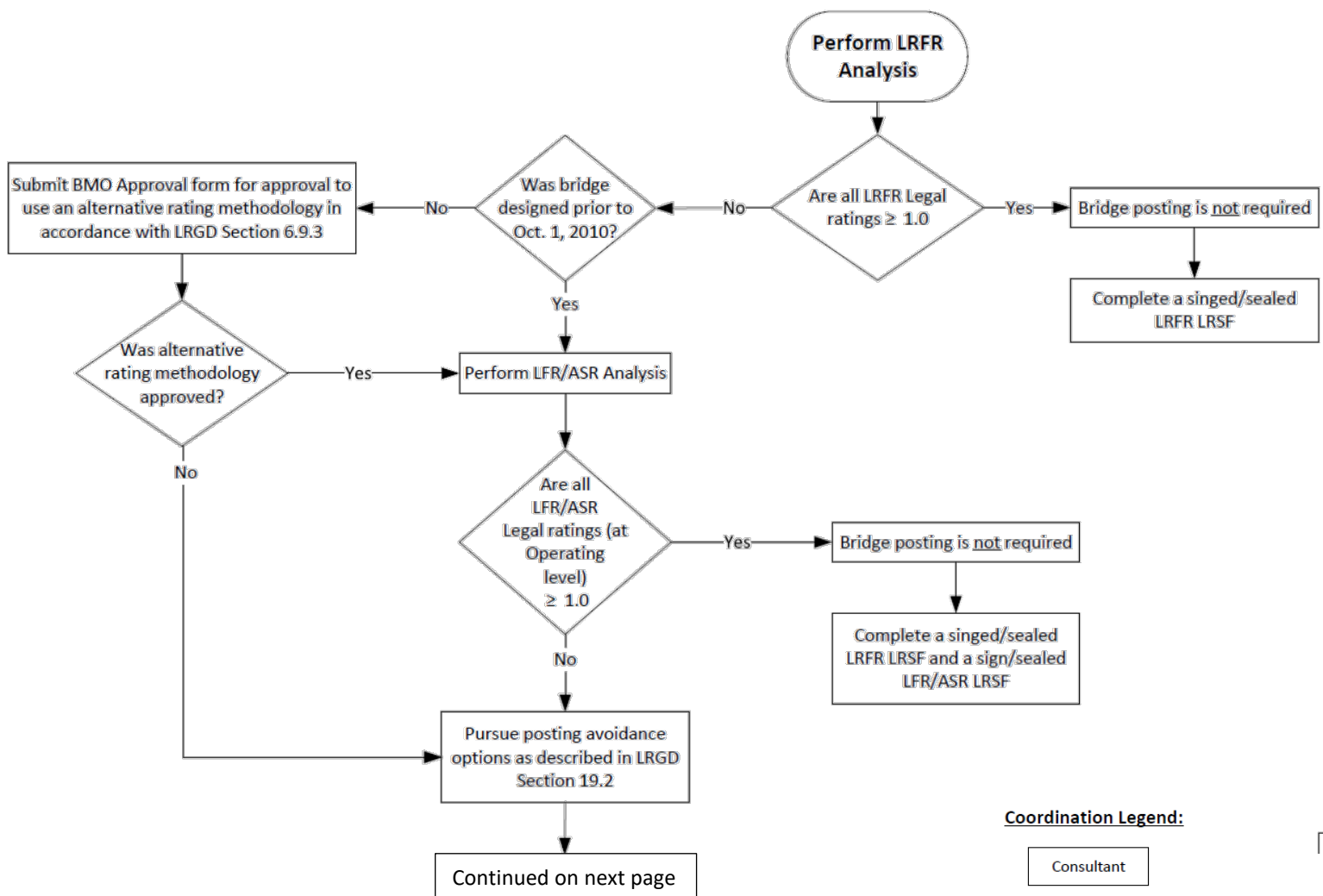
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**SCDOT Load Rating
Bridge Posting Flowchart**



Coordination Legend:

Consultant
Michael Baker
BMO

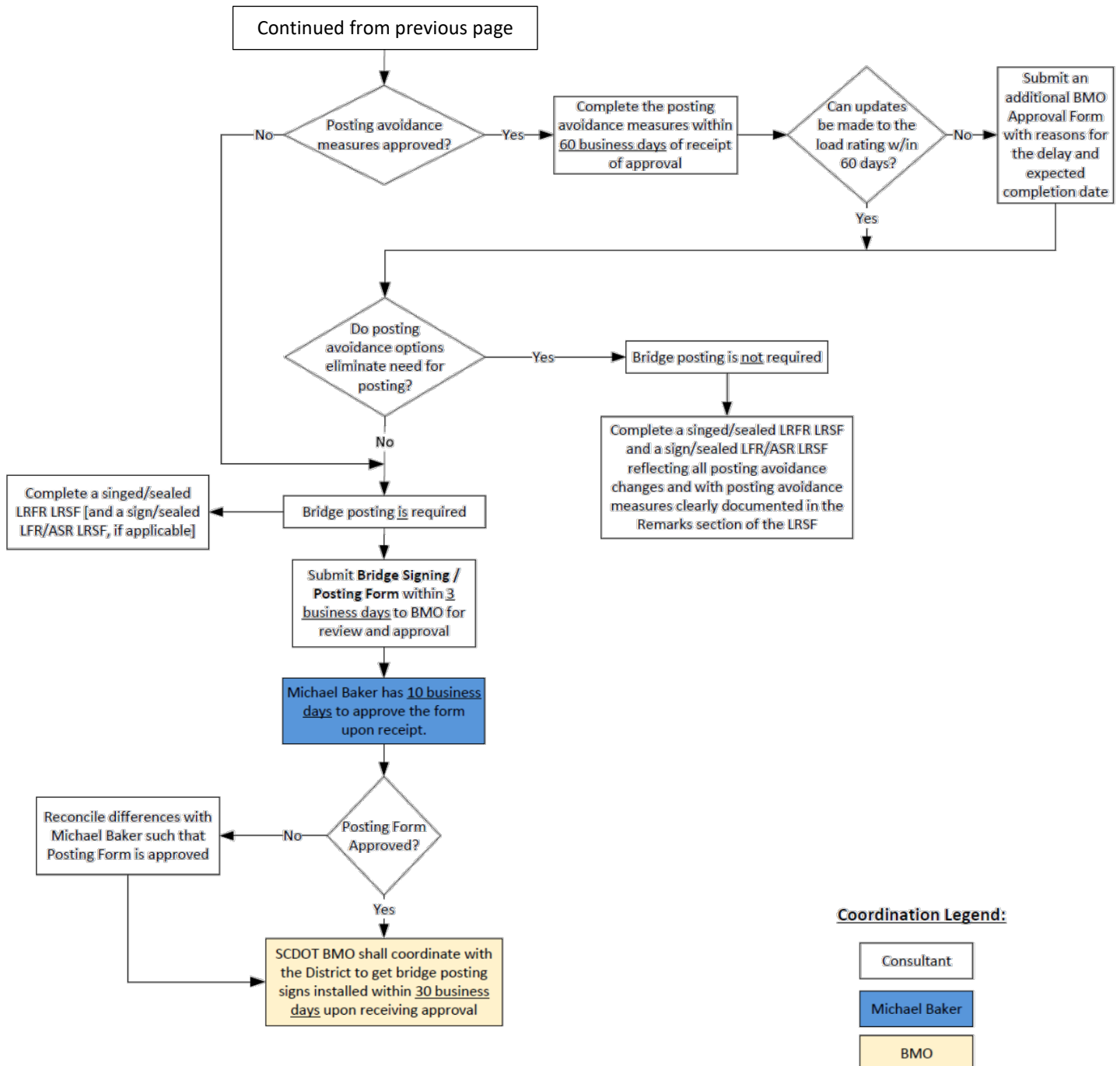
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4. NBI Item 33 Bridge Median, for Culverts (*HD036)

Question:

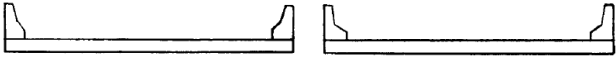
In reviewing the inventory information for the bridges in our district, it appears that there is quite a bit of inconsistency and we were hoping to get some guidance regarding the coding for National Bridge Inventory (NBI) Item 33 Bridge Median, for culverts. We have looked statewide and have found that there are less than 60 culverts with Item 33 coded 1, 2 or 3 (note there are only 3 culverts with Item 33 coded '3'); with the rest being coded '0'.

**NBI Item 33 Coding
page is copied here for
reference:**


Item 33 - Bridge Median 1 digit

Indicate with a 1-digit code if the median is non-existent, open or closed. The median is closed when the area between the 2 roadways at the structure is bridged over and is capable of supporting traffic. All bridges that carry either 1-way traffic or 2-way traffic separated only by a centerline will be coded 0 for no median.

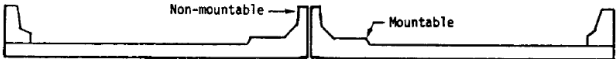
Code	Description
0	No median
1	Open median
2	Closed median (no barrier)
3	Closed median with non-mountable barriers



Open Median



Closed Median



Closed Median with Non-mountable Barrier

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A few Asset ID examples of existing Item 33 coding are shown below:



02350 (Florence) – '0' - No Median, culvert beneath both bounds with grass median between



00599 (Chesterfield) – '1' - Open Median, culvert beneath both bounds with grass median between



01228 (Sumter) – '2' - Closed Median (no barriers), culvert beneath both bounds with grass/tree median



04016 (Anderson) – '3' - Closed Median (non-mountable barriers), culvert beneath, barrier between

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Answer:

NBI Item 33 – Bridge Median at culverts shall be coded as follows:

0 – No median for structures running beneath one-way traffic or two-way traffic with no median (separated by a double yellow line or center turn lane).

1 – Open median for structures located side by side sharing the same Asset ID where two-way traffic is physically separated by barriers (e.g. guardrail).

2 – Closed median (no barrier) for structures running beneath two-way traffic and separated (typically by vegetation or concrete medians) without permanent, non-mountable barriers. Engineering judgment should be used to determine if the median is capable of supporting traffic, and if not, then a repair recommendation should be made to the structure owner to add a barrier (e.g. guardrail).

3 – Closed median (non-mountable barriers) for structures running beneath two-way traffic and separated by one or more non-mountable barriers.

Note:

- Permanent barriers shall be considered non-mountable if they are greater than 6" in height (and mountable if 6" or less). There may be other cases where engineering judgment by the load rater is necessary, for instance where overlays are in place or may be placed in the future.
- Median vegetation (i.e. trees, shrubs, etc.) should not be considered a permanent, non-mountable barrier.
- Barriers (e.g. guardrails) shall be continuous on both sides to be considered for Case 3.

The Asset IDs provided as examples in question above should be coded as follows:

- 02350: 2 – Closed Median (no barrier)
- 00599: 2 – Closed Median (no barrier)
- 01228: 2 – Closed Median (no barrier)
- 04016: 3 – Closed Median (non-mountable barriers)

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5. Service III Limit State Rating Waiver (*HD046)

Question:

LRGD Section 19.2.2 currently reads: *This requirement applies to bridges rated by the LRFR method. For prestressed concrete bridges, the Service III limit state shall be considered in the legal load rating analysis. If the Service III limit state yields a controlling rating factor lower than 1.0, the Service III limit state may be waived if the latest bridge inspection is showing no signs of either shear or flexural distress and upon approval by the SBME or designated representative (see Bridge Maintenance Office Approvals Form in Appendix A20.2). However, waiving the Service III limit state will not be approved where salt is prevalent (coastal and mountainous regions).*

Can this be revised to only require Bridge Maintenance Office (BMO) approval when the bridge is located in coastal and mountainous regions?

Answer:

The response below supersedes the previously posted response to Help Desk e-Notification 046.

Yes, for the remainder of this load rating contract, the above paragraph is revised to read:

*This requirement applies to bridges rated by the LRFR method. For prestressed concrete bridges, the Service III limit state shall be considered in the legal load rating analysis. If the Service III limit state yields a controlling rating factor lower than 1.0, the Service III limit state may be waived **if there is no evidence of cracking in the prestressed girders under normal traffic and the structure has been in service for an appreciable amount of time** (refer to MBE Section C6A.5.4.2.2a).*

The intent of this modification is to alleviate the extra effort required to complete a BMO approval form and submit all additional documentation each time the Service III check drops the legal ratings less than 1.0. The load rater is now permitted to waive the Service III check without BMO approval as long as there is no evidence of cracking under normal traffic. **Waiving the Service III check is not permitted for bridges currently in design.** Justification for ignoring Service III shall be documented in the Remarks section of the Load Rating Summary Form.

Reminder: In accordance with the second paragraph of Section 19.2.2 of the LRGD and Section 6A.5.11.5.1 of the MBE, the Service III limit state is mandatory for the legal load ratings of post-tensioned concrete segmental bridges and may not be waived.

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6. P/S Beams – Continuous for Live Load Based on Plan Details (*HD037)

Question:

The AASHTOWare BrR control option for Prestressed Beams in the Load Rating Guidance Document (LRGD) shows LRFR multi-span analysis as “Continuous and Simple”, which uses the maximum moments from simple span analysis for all loads and continuous span for the Live Load analysis. This results in the controlling rating factor numbers for LRFR (which are almost always below 1.0) for several of the bridges we are looking at.

The plans do not specifically state that it was designed as continuous for live load, but the extra deck reinforcing over the piers and plan details with a solid concrete diaphragm at the piers clearly point to the intent of the original design as continuous for live load.

Therefore, we feel that in such a case it is reasonable to use “Continuous” as the control option for LRFR multi-span analysis, which would treat it as continuous for superimposed Dead Load & Live Load. This results in an increase in rating factors. Please confirm that this approach is acceptable when the plan details indicate that the structure acts as continuous for Superimposed Dead Load & Live Load.

Answer:

The presence of continuity diaphragms and/or supplemental deck reinforcing over the intermediate supports on multi-span prestressed concrete bridges do not necessarily indicate continuous span behavior in the prestressed girders under superimposed dead loads (SDL) and live loads (LL). The AASHTO LRFD Bridge Design Specifications (LRFD) Section 5.12.3.3.5 states some additional requirements. Therefore, continuous span behavior (for SDL and LL) shall only be modeled when **one** of the below requirements are satisfied:

- The plans clearly state the bridge was designed continuous for live load.
- One of the requirements of LRFD Section 5.12.3.3.5 are satisfied and a BMO Approvals Form has been submitted and approved. This request shall be made in the “Other” category of the BMO Approvals Form. Section 4 of the form shall provide the reason(s)/justification for analyzing as continuous span and all supporting analysis files (i.e., calculated stress at the bottom of the continuity

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diaphragm under the load combination provided in LRFD 5.12.3.3.5) shall be submitted with the request.

- The bridge is composed of Prestressed Concrete Beams designed in 2008 or later and, based on engineering judgement, the criteria of Bridge Design Memorandum DM0108 have been met.

Note: If the Service III concrete tensile stress limit state governs the simple span ratings, LRGD Section 19.2.2 and MBE Section 6A.5.4.2.2a allow the Service III limit state to be ignored for bridges which show no signs of flexural distress. This could potentially eliminate the necessity to account for continuous span behavior in multi-span prestressed bridges where the simple span ratings are greater than 1.0 when Service III is ignored. If Service III is ignored in accordance with the guidance set forth in Item 5 of this Technical Note, then add a note to the rating assumptions stating that the Service III limit state was ignored and there are no signs of flexural distress.

When continuous span behavior is warranted by a note on the plans stating the bridge was designed continuous for live load and/or via an approved BMO Approvals Form, the multi-span analysis member control option in AASHTOWare BrR shall be set to “*Continuous*”, as shown in Figure 1 below.

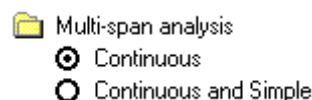


Figure 1 – Control Option for Multi-Span PS Beams Analyzed as Continuous

If simple span ratings of a multi-span prestressed girder bridge are lower than anticipated and/or would require bridge posting and would benefit from continuous span behavior, then proceed with the additional analysis described in LRFD Section 5.12.3.3.5 as part of a posting avoidance option and submit a BMO Approvals Form as described in this Technical Note. If approved, add a note to the rating assumptions stating that the bridge was rated as a continuous structure and there are no signs of flexural distress.

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7. Routed Inspections in BIO

Please be aware that SCDOT routine and special NBIS inspections are being performed in parallel with load rating consultant data correction in Bridge Inspection Online (BIO). Once an inspection is complete, the NBIS inspector routes the inspection report to the appropriate entity to be reviewed and uploaded into the Roadway Inventory Management System (RIMS), similar to data correction and load rating data updates.

If a structure has been routed after an inspection and is still in the process of being uploaded to RIMS, Load Rating Consultants shall refrain from updating any data correction or load rating data updates. If the structure is still in its routing process, the structure's *Worklist* screen in BIO will appear similar to the screenshot shown below:

(008) Bridge ID:	4220017020700	(005) Route:	SPARTANBURG US-176
(420) Asset ID:	3501	(006) Crossing:	I-26
(002) District:	3	(419) Ramp No:	
Inspected By:		Reviewed By:	
Status:	Routed to HQ for QA and upload into RIMS		
Status Date:	1/9/2020 10:22:08 AM		
			
		Update	Upload Docs
		Routing	

Consultants shall check the structure's routing status and only complete the data correction and load rating data update when the status has been changed to "Uploaded into RIMS."

*Previous Load Rating Project Help Desk Reference, either copied or updated for this Technical Note.

Please direct any questions concerning the above to:

Michael Baker International

e-mail: SCDOT_LR_Help_Desk@listserv.bakerprojects.com